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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/706,676	11/12/2003	Ofir Zohar	TUC920085004US1 (0130,U01	8317
85071	7590	03/18/2010	EXAMINER	
GRIFFITHS & SEATON PLLC (IBM2)			PATEL, KAUSHIKKUMAR M	
2108 N. Lemon Street				
Mesa, AZ 85215			ART UNIT	PAPER NUMBER
			2186	
			NOTIFICATION DATE	DELIVERY MODE
			03/18/2010	ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

docketing@gs-iplaw.com

<b>Office Action Summary</b>	<b>Application No.</b> 10/706,676	<b>Applicant(s)</b> ZOHAR ET AL.	
	<b>Examiner</b> Kaushikkumar Patel	<b>Art Unit</b> 2186	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 17 December 2009.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 10-18,22,24,26,28 and 30-36 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 10-18,22,24,26,28 and 30-36 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                     | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Response to Amendment***

1. This Office Action is in response to applicant's communication filed December 17, 2009 in response to PTO Office Action mailed September 17, 2009. The applicant's remarks and amendments to the claims and/or specification were considered with the results that follow.
2. In response to last Office Action, no claims 15 have been amended. No claims have been added or canceled. As a result, claims 10-18, 22, 24, 26, 28 and 30-36 remain pending in this application.

### ***Response to Arguments***

3. Applicant's arguments filed on December 17, 2009 with respect to claim 10 have been considered but they are moot in view of new grounds of the rejection.

### ***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 10-18, 22, 24, 26, 28 and 30-33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Blumenau et al. (US 2004/0054866), Ofer et al. (US 6,209,059) and Fitzgerald et al. (US 6,311,257).

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As per claims 10, 11, 31 and 33, Blumenau teaches a method/a storage system (Blumenau: fig. 1) for processing data, comprising:

storing and recalling data in a plurality of logical units (LUs) (Blumenau: fig. 3, items 53-56; col. 2, par. [0010], controlling access to the data storage means storing and recalling data to/from the storage devices/LUs) comprising a plurality of physical media (Blumenau: fig. 1, items 28, 29, 30, 31, par. [0058]), responsively to the commands (Blumenau: par. [0060]); and

configuring in each of a plurality of ports (Blumenau: fig. 3, items 51, 52).

Blumenau fails to teach but in an analogous art, Ofer teaches port/controller being adapted to maintain a plurality of LU command queues, each of the plurality of LU command queues corresponding to a respective one of the LUs, such that upon receiving a command directed to a specific LU at a given port, the given port places the received command in the respective LU command queue (Ofer: fig. 2, items 27a1 - 27an; col. 4, lines 1-20).

The combination of Blumenau and Ofer would have been obvious to one of the ordinary skill in the art at the time the invention was made because the method of Ofer allows a logical device to be added, removed or repositioned without requiring the storage system to be taken off-line (Ofer: abstract).

Thus, Blumenau and Ofer further teaches the port converts the received commands to one or more converted commands at least some of which are directed the plurality of the physical media of the one of the LUs, and conveys the at least some

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converted commands to the plurality of the physical media (Blumenau: fig. 4, item 80, par. [0060]; Ofer: col. 4, lines 58-60).

Blumenau and Ofer teaches logical units with respective command queues as explained above, however they expressly fail to teach but in an analogous art Fitzgerald teaches conveying commands in an order determined by the respective LU command queue, so that an order of arrival of the conveyed converted commands at the specific LU complies with the order of arrival of the received command at the given port (Fitzgerald: col. 1, lines 23-63. Fitzgerald here teaches each logical unit with respective FIFO command queue means when the command is received from the host for the particular logical volume it is placed in the respective command queue in the order of arrival (FIFO) and the commands from the specific command queue are executed in the order of arrival).

Thus, the combination of Blumenau, Ofer and Fitzgerald would have been obvious to one of the ordinary skill in the art at the time the invention was made to avoid inconsistencies in the storage system by maintaining order of commands at respective queues.

The combination of Blumenau, Ofer and Fitzgerald expressly fail to teach wherein an order of concurrent commands from different ports arrives at the specific LU in an arbitrary order of arrival. With respect to this limitation it is noted that Ofer and Fitzgerald both teach each logical unit/volume has its own command queue as well as each controller (port) with number of command queues equal to number of logical volumes and the command queues are operated in FIFO order, but they are silent about

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the order in which the commands are selected from respective command queues.

However it is inherent that the commands from the each of the request queues as well as each of the host controller must be serviced in some type of order, e.g. the command is selected from the each of the request queue in round robin fashion or one must assign a priority to each controller/queue and select the commands from the respective queue based on the set priority or in a random/arbitrary manner. As noted above, only limited number of solutions are available to serve the user requests for the data and since Blumenau, Ofer and Fitzgerald are silent about how the commands from the respective queues are selected, it would have been obvious to one having ordinary skill in the art at the time of invention to try to select the commands in an arbitrary order from any of the limited number of available solutions with a reasonable expectation of success to service the user requests to arrive at applicant's invention of selecting the command in arbitrary order of arrival (see *KSR International Co. v. Teleflex Inc.*, 550 U.S. \_\_\_, \_\_\_, 82 USPQ2d 1385, 1395-97 (2007)).

As per claims 12 and 32, Blumenau, Ofer and Fitzgerald teach wherein the plurality of ports comprises a first port and a second port (Blumenau, fig. 3),

wherein the first port conveys a first string of the at least some converted commands in a first order to the plurality of the physical media (see claim 1, above, which teaches converting commands and conveying the commands in the order);

wherein the second port conveys a second string of the at least some converted commands in a second order to the plurality of the physical media (see claim 1, above, which teaches converting commands and conveying the commands in the order);

wherein the plurality of the physical media is adapted to receive the first string and to store and recall the data in response to the first order and to receive the second string and to store and recall the data in response to the second order (as explained with respect to claim 10, above the order is necessary to avoid inconsistencies and storing and recalling data to/from physical media is inherent in the system of Blumenau, Ofer and Fitzgerald).

As per claim 13, Blumenau teaches wherein the command comprises a request according to a small computer system interface (SCSI) protocol, and wherein the storage system is operative according to the SCSI protocol (Blumenau, pars. [0063], [0069]).

As per claim 14, Blumenau teaches wherein each of the ports comprises a respective central processing unit (CPU) which operates each of the ports substantially independently (Blumenau, fig. 4, item 76, here it is also noted that each port has its CPU and memory for performing various functions means each port operates independently).

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As per claim 15, Blumenau and Ofer teach wherein the command comprised in one of one or more strings of commands (Ofer, col. 4, lines 1-20; host issues a plurality of data requests, means string of commands), each of string of commands being directed via one of the ports to a respective one of the LUs (Ofer, col. 4, lines 1-11), and comprising a coupling (fig. 1, here it is noted that coupling is inherent to couple the port to the host) which:

receives the command comprised in the one or more strings; sorts the commands according to the ports via which the commands are directed and conveys the commands to the ports to which the commands are directed (Blumenau, fig. 4, shows a plurality of hosts are connected to the storage controller with several ports and each port is assigned LUs (fig. 3), where it is readily apparent that the commands must be sorted according to ports and as taught in claim 1, Ofer teaches placing respective commands in respective command queues, Ofer, col. 4, lines 1-20).

As per claims 16 and 17, Blumenau, Ofer and Fitzgerald teach storage system (Blumenau/Ofer fig. 1), where the host requests the data to/from storage system (e.g. read and write command) and the port/controller converts the received logical command into physical commands (see claim 1), where it is readily apparent that the converted commands recalls the data (in case of read command) from the physical media and/or stores data received from the host into the physical media of the storage system (write command), thus satisfying the limitations of claims.



As per claim 18, Blumenau teaches wherein the plurality of physical media comprises the data (inherent) and wherein the port is adapted to track changes of the location of the data within the plurality of the physical media (Blumenau, figs. 5-10, teaches various mapping tables, which tracks the data residing in the physical media and it is inherent in the system of Blumenau that during the period of the time the data stored in the physical media changes (e.g. modified, added, deleted etc.) and thus the mapping tables of the controller (port) keeps track of the changes of the data locations).

As per claim 22, Blumenau, Ofer and Fitzgerald teach wherein at least one of the converted commands directed to the plurality of the physical media is first sent to a fast access time memory acting as a buffer, said fast access time memory being adapted to redirect the converted command to a respective physical media (Blumenau, par. [0060], teaches cache memory, which is first accessed and if data is not stored then the request is forwarded to the physical media. Ofer, par. [0002] also teaches a cache).

As per claim 24, Blumenau teaches wherein the plurality of the physical media comprises a plurality of slow access time non-volatile physical media (Blumenau, par. [0058], optical drives, tape drives are slow access time medias).

As per claim 26, Ofer teaches wherein a particular physical media of the plurality of the physical media changes over time (Ofer, col. 5, lines 15-26) (for motivation please refer to claim 10 above).

As per claim 28, Blumenau teaches storage system providing logical units (LUNs) with RAID functionality (Blumenau, par. [0062]) where it is readily apparent that data is distributed across the plurality of physical media.

As per claim 30, Blumenau teaches a storage system with SCSI protocol (see claim 4 above), where it is readily apparent that the hosts are using SCSI commands for reading and writing data to/from storage system (physical storage media) and thus it is inherent in the system of Blumenau to determine the type of command (e.g. read, write etc.). It is also noted that the format of SCSI command requires use of a logical block address and a length of the data string, thus it is also inherent to convert the logical block address and data string into the appropriate physical command.

6. Claims 34-36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Blumenau et al. (US 2004/0054866), Ofer et al. (US 6,209,059), Fitzgerald et al. (US 6,311,257) and further in view of Bearden (US 2004/0205297).

Claims 34-36 are similar in scope with the claims 10-12 and/or 31-33, however Blumenau, Ofer and Fitzgerald fail to teach a storage medium storing instructions to perform the method steps as recited in claims 34-36. Bearden teaches a storage device with instructions to perform the method steps (Bearden: par. [0034]). Thus, it would have been obvious to one having ordinary skill in the art at the time of the invention to provide well known technology of storing instructions on storage device to perform

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computer implemented method as taught by Bearden in the system of Blumenau, Ofer and Fitzgerald to optimize the factors such as cost, speed and reliability.

Thus, claims 34-36 are rejected under the same rationales as applied to claims 10-12 and/or 31-33 and further in view of computer readable medium taught by Bearden.

### ***Conclusion***

7. The examiner also requests, in response to this Office action, support be shown for language added to any original claims on amendment and any new claims. That is, indicate support for newly added claim language by specifically pointing to page(s) and line no(s) in the specification and/or drawing figure(s). This will assist the examiner in prosecuting the application.

8. When responding to this office action, Applicant is advised to clearly point out the patentable novelty which he or she thinks the claims present, in view of the state of the art disclosed by the references cited or the objections made. He or she must also show how the amendments avoid such references or objections See 37 CFR 1.111(c).

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kaushikkumar Patel whose telephone number is (571)272-5536. The examiner can normally be reached on 8.00 am - 5.00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matt Kim can be reached on (571) 272-4182. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Kaushik Patel/  
Kaushikkumar Patel  
Examiner  
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